Space Weather Forecast

Issued on Friday, 19 August 2022 at 01:31 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Minor or Moderate storms on days 1 or 2 (19th/20thh Aug). Chance of further Moderate flares (R1-R2 Radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with three Moderate-class flares observed in the past 24 hours, from a relatively complex region in the southwest quadrant. There are currently five numbered sunspot regions and one small un-numbered region on the visible disc. The region mentioned above is the largest and most active region and is displaying strong spots with magnetic complexity. The two other most notable spot regions are a bi-polar region in the northeast quadrant, and another bi-polar group now in the northwest quadrant. Although only isolated Common-class flares have been produced by these. Another new bi-polar region has developed in the southeast quadrant during this period, but remains stable. All other regions are currently small and unremarkable.

A Coronal Mass Ejection (CME) associated with the largest flare from the complex sunspot region in the southwest, just before midday, has been analysed, and is likely to miss Earth, passing to the south on the 20th into the 21st. Another CME from this region was observed in association with a drawn out common-class flare, commencing at 18/2212 UTC. This will require further analysis, when imagery becomes available to determine whether it is Earth directed, along with a CME that originated from an old sunspot region near the northwest limb at 18/1234 UTC.

Solar Wind / Geomagnetic Activity: The solar wind has been elevated to strong during this period, between 520 and 630 km/s. The Interplanetary Magnetic Field has generally been at Moderate levels (8-15 nT), with moderate fluctuations in the north-south component. Parameters are indicative of an enhancement from a coronal hole fast wind, but some influence from a CME is likely to have occurred from 18/0945 UTC. Resultant Geomagnetic activity was initially Unsettled (Kp 3), but Active to G1/Minor Storm levels from 18/1200 UTC.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Low to Moderate with chance of further Moderate-class flares and a slight chance of a Strong flare. The most likely source region for any larger flares would be from the larger magnetically complex region in the southwest quadrant.

Solar Wind / Geomagnetic Activity: Solar winds are likely to remain elevated through much of this period due to coronal hole fast wind influences. However, on days 1 and 2 (19th and 20th) they may become further enhanced, due to glancing blows from a series of CMEs. Corresponding geomagnetic activity is expected to be Unsettled to Active, with a chance of Minor or Moderate Storm intervals on days 1 and 2 (19th and 20th). Towards the end of the period activity is likely to become predominantly Quiet to Unsettled.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, but there is a slight chance of an S1 or greater event. This is mainly due to the more complex region which is now in the southwest quadrant of the Sun, where any proton events are more likely to reach Earth.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	50	40	10	5
Strong	G3	No	10	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	40	30	20
Very Active	R3 to R5 X	No	5	5	5	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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